Remarks

According to the Advisory Action mailed March 24, 2004, Applicant's reply of February 19, 2004 overcomes the written description rejections of claims 33-37 and 49. However, the Advisory Action maintains the utility rejections. The Advisory Action states that a review of the literature did not identify a well-known utility for the DS-CAM nucleic acid molecules as a diagnostic marker for Down syndrome (DS). Applicant respectfully traverses.

During the 12 April Interview among Examiner Juliet Switzer, Inventor Julie Korenberg, and Patent Attorney James Zhu, Applicant argued that the utility requirement is met by the disclosure of the specification and knowledge in prior art references. In particular, the claimed molecules (DS-CAM) can be used as a marker for the detection of clinical features of Down syndrome (DS) such as congenital heart disease based on the presence of the coding sequence of DS-CAM in a region of chromosome 21 that has previously shown to be associated with DS. Examiner Switzer suggested that Applicant file arguments which clearly point out how the specification and prior art support Applicant's statement that DS-CAM can be used as a marker for the detection of DS. As a result of the interview, Applicant proposed that Applicant file a Request for Continued Examination under 37 C.F.R. §1.114 with a declaration under 37 C.F.R. §1.132 pointing to the specification and the prior art references in support for the disclosure of a specific, substantial, and credible utility.

The declaration under 37 C.F.R. §1.132 by inventor Julie Korenberg is accompanied with this reply. As stated in the declaration, the specification and prior art references support the use of DS-CAM a diagnostic marker for the detection of clinical manifestations of Down syndrome including congenital heart disease or duodenal stenosis.

Prior to the earliest filing date of the present application, it was well known that a gene identified and located in the Band q22 region of chromosome 21 assumed the role of being a molecular marker of DS. Korenberg et al., Am. J. Hum. Genet. 47: 236 –

246 (1990)(Exhibit 1). Since DS-CAM maps to the region in Band q22 from D21S55 through MX1 (See Specification, Figure 1), DS-CAM naturally and necessarily assumes the role of being a molecular marker for DS.

In addition, it was well known that three DNA copies of D21S15 are associated with clinical features of DS including congenital heart disease (CHD) and/or duodenal stenosis (DST). Korenberg et al., AM. J. Hum. Genet. 50: 294-302 (1992) (Exhibit 3, the Abstract). See also, Korenberg et al., Proc. Nat'l Acad. Sci. USA 91: 4997-5001 (1994) (Exhibit 4, p. 4998, Table 1 & p. 4999, Table 2). Since D21S15 is located in the middle of DS-CAM (Specification, Figure 1), DS-CAM itself is a DNA probe in the duplicated region of chromosome 21 which is associated with clinical features of DS including CHD and/or DST.

Furthermore, it was well known that a DNA probe in the potential duplicated region can be used to estimate the copy number of aneuploidy DNA in the region and thus diagnose the clinical features of DS using the Southern blot dosage analysis. Epstein et al., Am. J. Hum. Genet. 49: 207-235 (1991) (Exhibit 2). Since DS-CAM is in the potential duplicated region of Band q22, naturally DS-CAM can be used to estimate the copy number of DNA in the region for the diagnosis of clinical features of DS including CHD and/or DST.

In light of the foregoing, a person of ordinary skill in the art would immediately recognize that DS-CAM is useful as a molecular marker for diagnosing clinical features of Down syndrome such as congenital heart disease or duodenal stenosis.

The utility of claimed DS-CAM is also credible, substantial and specific. "Credibility" is assessed from the perspective of one of ordinary skill in the art in view of the disclosure and any other evidence of record that is probative of the applicant's assertions. M.P.E.P. 2107. Prior to the filing of the present invention, the SOD1 gene, which was identified and located in the DS region, had been used as a molecular marker of DS. Korenberg et al., Am. J. Hum. Genet. 47: 236 – 246 (1990)(Exhibit 1).

Analogous to the SOD1 gene, DS-CAM gene is identified and located in Band 21q22 region from 21S55 through MX1.

A "substantial utility" is defined as "real world" use. A utility is not considered "substantial" if it requires or constitutes carrying out further research to identify or confirm this "real world" use. For example, both a therapeutic method of treating a known or newly discovered disease and an assay method for identifying compounds that themselves have "substantial utility" constitute a "real world" use. M.P.E.P. 2107.01. As discussed above and in the declaration, DS-CAM is a molecular marker for DS and can be used to estimate the copy number of DNA in the region for the diagnosis of clinical features of Down syndrome such as congenital heart disease or duodenal stenosis. Accordingly, the claimed invention constitutes a "real world" use.

A "specific utility" is specific to the subject matter claimed. This is in contrast to a "general utility", which is applicable to a broad class of inventions. For instance, a claim to a nucleic acid whose use is described simply as "gene probe" or "chromosome marker" is not specific without disclosure of a specific DNA target. Likewise, a general statement of diagnostic utility, such as a method of diagnosing an unspecified disease, is not specific absent a disclosure of the condition to be diagnosed. M.P.E.P. 2107.01. In the present application, however, the claimed nucleic acids are used to diagnose specific clinical features of Down Syndrome including as congenital heart disease or duodenal stenosis, and therefore the claimed inventions clearly meet the "specific utility" criteria.

In light of the foregoing and in view of the declaration, a person of ordinary skill in the art would immediately appreciate why the claimed invention is useful as a diagnostic marker for diagnosing clinical features of Down syndrome such as congenital heart disease or duodenal stenosis. In addition, such a utility is specific, substantial, and credible. Accordingly, Applicant believes the specification meets the utility requirements of 35 U.S.C. 101. See, M.P.E.P. 2107. Applicant respectfully requests that the utility rejections of claims 1, 31-32, 38-46 and 48 be withdrawn.

CONCLUSION

In view of the foregoing, it is submitted that the present claims 1, 31-32, 38-46, and 48 are in condition for allowance. Accordingly, Applicant respectfully requests that a Notice of Allowance be issued.

Respectfully submitted,
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